PROPOSED SITE CHARACTERIZATION AND PRELIMINARY REMEDIATION PLAN

Sooner Dial Site
Clinton, Oklahoma

FEBRUARY 21, 1992

9532759

TECHRAD Environmental Services, Inc.
4619 N. Santa Fe
Oklahoma City, OK 73118

SITE CHARACTERIZATION PLAN

Sooner Dial Company Site
Clinton, Oklahoma

HISTORICAL REVIEW

The former Sooner Dial Company site, located at 1002 S. 10th Street near downtown Clinton, was the location of an aircraft instrument refinishing operation. In the process of refurbishing these instruments, a mixture of radium and a paint containing a phosphor activated by the alpha particles emitted by the radium was applied to the instrument dials. The process of removing the old radium/paint mixture and the application of new paint created substantial amounts of radium-contaminated waste. Some of the waste was in the form of a slurry and some was in the form of very small pieces of metal or hardened paint. The handling, storage, and disposal of such waste was not regulated or managed to the extent required by today's standards. The plant ceased operation in 1969.

PRELIMINARY SURVEY

A preliminary radiation level survey has been conducted at the site, using a Ludlum Model 19 Micro R Meter. Readings were recorded on a grid system at one meter above ground level. The preliminary survey results are displayed on the attached sketch.

SITE CHARACTERIZATION WORKPLAN

The purpose of the site characterization is to determine the extent of the radium contamination at the site and nearby areas. For this site, the workplan also includes a test plot to evaluate the optimum and most cost effective methods for decontamination. The goal of the total effort is to decontaminate the site to a level where it is suitable for unrestricted use.

The following sequential actions will be undertaken for the characterization:

1. Establish a grid system with 2-meter-square grids over the entire site, less and except the auto shop building on the north site of the site. The grid system will include the easements, the alley, and any other publicly-owned strips of land abutting the site. The grid system will be marked with flags. The grid will be displayed on a scale drawing of the site.

2. Survey and record the gamma radiation levels at the surface and at a height of 1 meter above the surface at each corner established by the grid. Isopleths of the gamma levels found will be drawn on the scale drawing of the site. The levels will be portrayed in microroentgens per hour (uR/hr).

3. Core samples will be drilled at selected locations, based on the gamma radiation survey data and will be collected and analyzed for radium content. Coring will be to a depth of 2 feet with each 6-inch segment analyzed separately. Twenty-five core samples will be taken within the gamma level isopleths, with the locations selected to provide a representative surface intensity level. The location of each core sample will be annotated on the grid system. Next to each core sample location, an additional soil sample for radium analysis will be collected through the accumulation of approximately 1,000 grams of soil, using a garden trowel to a depth of 6 inches.

4. The soil samples will be analyzed by the State of Oklahoma Environmental Laboratory Service Radiochemistry Lab. The samples will be dried and mechanically crushed in order to pass through a 10 mesh sieve prior to analysis. A minimum of three weeks will elapse before counting, in order to allow the radionuclides to reach secular equilibrium. The results of analysis will be presented as picocuries of radium per gram of soil (pCi/g). After the soil analysis results are known, an evaluation will be performed to determine if there is a correlation between the surface gamma readings and the radium content and depth in the soil. This correlation, if it can be established, will be used in formulating the Remedial Action Plan for the site.

5. The building and concrete slab on the north side of the site will be surveyed for surface alpha activity, using an instrument equipped with an alpha scintillation probe. Readings will be taken at one meter grid intervals, on walls and the floor surfaces. Readings will be in units of disintegrations per minute per 100 square centimeters (dpm/100 cm^2). Areas exceeding 100 dpm/100 cm^2 will be marked with red paint for eventual decontamination.

6. The owner of the private property immediately to the west of the alley and behind the site will be contacted, and permission sought to perform a surface level gamma radiation survey, using the techniques discussed in paragraph 2 above. The owner of the private building immediately south of the site will be contacted, and permission sought to perform a building surface alpha activity survey, using the techniques discussed in paragraph 3 above.

7. Using a random, non-gridded approach, public access locations in all directions for several city blocks will be surveyed for surface level gamma radiation, with the location of any readings significantly above background recorded.

8. After laboratory results are available, establish a test plot of 15 feet by 15 feet, encompassing a representative cross-section of differing surface gamma radiation levels. The following activities will be performed in the test plot, using hand shoveling and other "pilot plant" level techniques:

   a. Determine if a major source of the radiation is metal fragments or other solid materials.

   b. Determine if these fragments can be physically separated from the soil using a sieving technique.

   c. Determine the sieve size that accomplishes effective separation, if separation is possible.

   d. Determine the depth of soil that must be removed to meet the target decontamination limits.

   e. Determine if soil can be segregated into "hot" and "clean" piles, using microroentgen per hour instrumentation to sample the piles. This will entail correlative soil analysis in the laboratory for picocuries per gram of soil determination.

   f. Determine the size of soil piles that can be handled using the above approach, if that approach appears feasible.

   g. Determine if mixing "hot" soil with new, clean soil from off-site is a feasible approach to reducing contamination levels to acceptable limits.

   h. Personal and area air monitoring will be performed during the test plot activity. Personnel engaged in the activity will wear respirators and other protective clothing.

9. After completion of the site characterization and test plot activity, develop a Final Remedial Action Plan which will include the following:

   a. Projected length of time to complete decontamination and cleanup activities.

   b. Contingencies which may arise which would affect decontamination and cleanup activities.

   c. Estimated resource requirements in terms of personnel, tools, radiation detection equipment, radiochemistry laboratory services,

heavy equipment such as earth movers, expendable supplies, and waste disposal services for waste removal from the site.

d. Estimated costs associated with the decontamination and cleanup.

e. Site security.

f. Public relations.

g. Method of informing surrounding property owners about site activities and procedures.

10. Submit the Final Remedial Action Plan to the State for approval. In order to provide a budgetary perspective for planning and decision-making purposes, a Preliminary Remedial Action Plan and cost estimate is submitted at this time based upon state assumptions.

RADIATION STANDARDS AND DECONTAMINATION CRITERIA

Both Federal and State radiation regulations limit radiation dose for an individual member of the general population to 500 mrem/year. Federal guidelines establish a 170 mrem/yr limit for a defined segment of the general population.

Regarding soil contamination, the Uranium Mill Tailings Radiation Control Act (UMTRCA), the U.S. Environmental Protection Agency (EPA) established standards for remedial action at radium-226 for the first 15 centimeters of surface and 15 pCi/g above background for inactive uranium mill sites. The final UMTRCA standards are 5 pCi/g above background for any subsequent 15 centimeter layer. Twenty (20) uR/hr above background and 0.02 Working Level (WL) are the established action levels for structures. These standards have been affirmed by EPA in a memorandum dated September 17, 1984, from Washington to Region I for use in remediation of radium contaminated properties in New Jersey.

For building contamination, in July 1982 the U.S. Nuclear Regulatory Commission provided regulatory guidance to its licensees concerning decontamination limits for alpha contamination prior to release for unrestricted use. These limits for radium-226 are an average of 100 dpm/100 cm^2 with a maximum of 300 dpm/100 cm^2 and removable contamination of 20 dpm/100 cm^2. Similar limits are used by the U.S. Department of Energy for remediation on DOE program sites.

In addition, some states including Oklahoma, are in the process of establishing permissible surface radiation levels for areas of naturally occurring radioactive materials. Permissible levels for these areas have been generally proposed in the 25-50 uR/hr range.

Normal background gamma level in the Clinton, Oklahoma area has been identified as around 8 uR/hr. The soil pCi/g background radium level in the Clinton area has not been established at time point, to our knowledge.

For this project, we propose the following decontamination criteria:

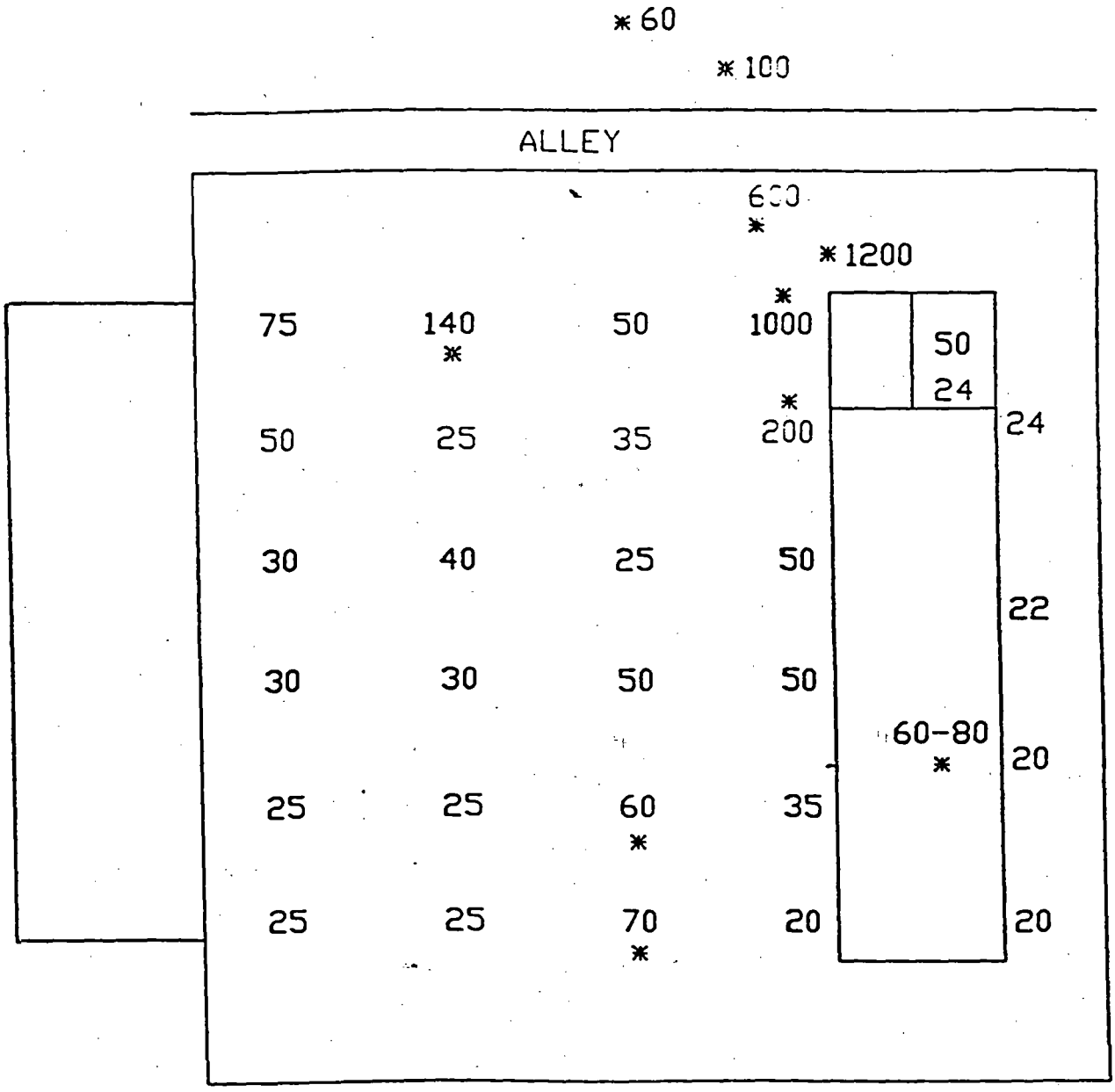
a. Surface soil gamma level of 20 uR/hr.

b. Soil radium content of 5 pCi/g above background for the top 15 centimeters; 15 pCi/g above background for any distance below the top 15 centimeters.

c. Building or other structure surface alpha level of less than 100 dpm/100 cm^2 average with a maximum of 300 dpm/100 cm^2, and removable contamination of 20 dpm/100 cm^2.

SOONER DIAL SITE
1002 S. 10th STREET
CLINTON, OK.

PRELIMINARY SITE SURVEY



Radiation Levels in uR/hr
at height of 1 meter

TECHRAD ENVIRONMENTAL SERVICES, INC.
4619 N. SANTA FE
OKLAHOMA CITY, OK. 73118
SCALE: NTS | DATE SURVEYED: 08-31-

SITE CHARACTERIZATION

COST ESTIMATE

Field Survey and Report

Certified Industrial Hygienist/Project Manager
48 hrs. @ (b) (4)
Hazardous Materials Field Technician
40 hrs. @ (b) (4)
Laboratory Analysis
125 samples @ (b) (4)
Contingency for Additional Core Samples:
10 samples @ (b) (4)
8 hrs. @ (b) (4)

Per diem, Travel, Motels:
Survey Equipment:

Subtotal

(b) (4)

Test Plot Evaluation

Certified Industrial Hygienist/Project Manager
24 hrs. @ (b) (4)
Hazardous Materials Field Technicians (2)
80 hrs. @ (b) (4)
Laboratory Analysis
10 samples @ (b) (4) (filters)
20 samples @ (soil)

Subtotal

TOTAL:

(b) (4)